Recruiting Strategies to Support the Army's All-Volunteer Force

Bruce R. Orvis, Steven Garber, Philip Hall-Partyka,
Christopher E. Maerzluft, Tiffany Tsai

Preface

The research described in this report was conducted to improve the Army's ability to use recruiting resources and enlistment eligibility policies effectively to meet enlisted accession requirements under varying recruiting conditions. It assesses potential effects of alternative recruiting resource and enlistment eligibility policies on recruit production and costs. We consider the cost of meeting accession requirements when an optimal mix of television advertising and enlistment incentives is feasible (the baseline strategy) or when an incentive-centric strategy—which favors incentives over other resources due to the faster rate of increasing recruits through incentives—is required.

The results for the alternative scenarios assessed under each strategy—which increase the number of recruiters, enlistment eligibility, or the Entry Delayed Entry Program (EDEP) level from their levels in our baseline strategy—indicate that, under good recruiting conditions, optimizing the mix of television advertising and enlistment bonuses minimized total cost, whereas increasing the number of recruiters, enlistment eligibility, or the number of youth recruited during the preceding year (to increase the EDEP) from their baseline levels in order to meet the accession requirement each raised the total cost. For average recruiting conditions, however, increasing recruiters reduced total cost. Under bad recruiting conditions, increasing recruiters or enlistment eligibility each lowered total cost by similar amounts.

An incentive-centric strategy raises total cost relative to optimizing the mix of advertising and bonuses. Given an incentive-centric strategy, under good recruiting conditions, a higher number of recruiters, increased enlistment eligibility, or a larger EDEP each reduced total

cost and did so by increasing amounts, respectively. Under average conditions, more recruiters, a larger EDEP, or greater enlistment eligibility each reduced total cost, by increasing amounts, respectively. Under bad conditions, only increasing enlistment eligibility was preferable to the incentive-centric baseline strategy.

This report will interest two audiences. First, it will prove useful to the specialized group involved in the Army's recruiting programs and organizations. It will also interest a more general audience because it discusses different recruiting strategies and various policy and resource alternatives, as well as how the policy and resource alternatives can be traded off under the different strategies and under differing recruiting conditions to get the best return on investment.

Contents

Tables

Summary

The research described in this report was conducted to improve the U.S. Army's ability to use recruiting resources and policies effectively to meet accession requirements under varying recruiting conditions. It assesses potential effects of alternative recruiting resource and enlistment-eligibility policies on recruit production and costs. We consider the cost of meeting enlisted force accession requirements when an optimal mix of television advertising and incentives is feasible or, alternatively, when an incentive-centric strategy is required.

Specifically, we developed a national-level model to predict Army enlisted accessions. Our model predicts contracts and accessions for all months. This allows us to model the timing of flows of enlistees into and out of the Delayed Entry Program, which differ depending on the type of enlistee and the prevailing recruiting conditions. A key component of the model is prediction of monthly high-quality, non-prior service (NPS) enlistment contracts. The equation we use to predict the number of such contracts highlights four of their key determinants:

- number of on-production recruiters
- expenditures on television advertising
- enlistment incentives (or bonuses) for high-quality prospects
- the national unemployment rate (ages 16 and older).

Other policy changes are available to the Army to help it meet the accession requirement and avoid unacceptably expensive recruiting resource levels. These include three enlistment-eligibility policies: allowing more NPS enlistment waivers, reallocating recruiter time to increase efforts to enlist more prospects not classified as high quality,

and increasing the number of enlistments among individuals who have previously served in the Army—i.e., prior-service accessions.

For the baseline levels of resources, eligibility policies, unemployment rates, and Entry Delayed Entry Program (EDEP) levels assessed, we found the following:

- When there is sufficient time to optimize the levels and mix of television advertising and incentives:
  - In good recruiting environments, it did not pay to increase recruiters, enlistment eligibility, or the EDEP.
  - In average recruiting environments, increasing the number of recruiters reduced total cost.
  - In bad recruiting environments, increasing the number of recruiters or enlistment eligibility lowered total cost.

- When there is not sufficient time to optimize the levels and mix of television advertising and incentives, resulting in an *incentive-centric strategy*[1] to reduce the lead time for obtaining the needed return on investment in recruiting resources, total costs increase substantially.
  - In our incentive-centric scenarios, under good recruiting conditions more recruiters, greater enlistment eligibility, or a larger EDEP each reduced the total cost. The three alternative policy options reduced the total cost by increasing amounts, respectively.
  - In average recruiting conditions, adding recruiters reduced total cost. Alternatively, increasing the EDEP was more cost effective than increasing recruiters, while increasing enlistment eligibility was the most effective tool.
  - In bad recruiting environments, under an incentive-centric strategy, increasing enlistment eligibility was the only alternative assessed that proved preferable to the baseline strategy.

---

[1] An incentive-centric strategy prioritizes the use of enlistment bonuses over advertising resources and increasing recruiters.

Acknowledgments

Abbreviations

ARMS	Assessment of Recruit Motivation and Strength
EBE	Enlistment Bonus Experiment
EDEP	Entry Delayed Entry Program
FY	fiscal year
GA	grad alpha
HQDA, G-1	Headquarters, Department of the Army, Office of the Deputy Chief of Staff for Personnel
MOS	Military Occupational Specialty
NPS	non-prior service
OPRA	on-production Regular Army
PS	prior service
RMC	regular military compensation
SA	senior alpha
TE	total annual expenditures
TTAS	Tier Two Attrition Screen
USAREC	U.S. Army Recruiting Command

Introduction

The all-volunteer Army has been in existence for more than 40 years. It has repeatedly proven its success by fielding an extraordinarily effective force. Its success, however, hinges on its ability to meet its recruiting requirements. The U.S. Army's ability to recruit the young people it needs, in turn, depends on the effectiveness of its recruiting resources and policies. Additionally, getting the best return on its investment requires an adroit balancing of these resources and policies. Until recently, Army recruiting programs cost about $1.5 billion annually. In recent years, Army recruiting programs have been cut significantly. Given planned reductions in Army end strength, pressures on government budgets, and public opinion concerning defense spending, funding levels are not likely to be restored in the foreseeable future. This situation increases the importance of questions concerning the level of spending actually required, how programs can be made more efficient, the optimal mix of recruiting resources and policies, and how the Army can best prepare for future contingencies.

The research discussed in this report was conducted to improve the Army's ability to use recruiting resources and policies effectively to meet accession requirements under varying recruiting conditions.[1] It assesses potential effects of alternative recruiting resource and

---

[1] This report was prepared in support of the Recruiting 2025 Forum conducted by the U.S. Army Recruiting Command. Its contents constitute a chapter in the book produced by that forum.

eligibility policies on recruit production and costs.[2] We consider the cost of meeting enlisted force accession needs under two levels of accession requirements, focusing primarily on a requirement consistent with currently expected levels, but also assessing a reduced requirement that could result from an end strength reduction. Our analysis of the lower accession requirement is a limited excursion to see whether the pattern of results for the baseline resource mix and eligibility policies differs from that for the larger requirement.

This report will interest two audiences. First, it will prove useful to the specialized group involved in the Army's recruiting programs and organizations. It will also interest a more general audience because it discusses different recruiting strategies and various policy and resource alternatives, as well as how the policy and resource alternatives can be traded off under the different strategies and under differing recruiting conditions to get the best return on investment.

Many variables affect the Army's recruiting success—some it can control, some it cannot. The Army can control such things as the number of recruiters it assigns, the incentives it offers, and what it spends on advertising, subject to its budget constraints. It also can control the enlistment-eligibility policies it chooses to employ in a given year, such as the percentage of high-quality recruits, the percentage of enlistment waivers granted, or the number of persons with prior service in the Army permitted to enlist. It cannot, however, influence the unemployment rate, which has an important effect on the willingness of youth to join the Army, or other factors, such as the recruiting resources spent by the other services or casualty rates or the "image" of the military, which can affect secular and cyclical trends in the views of both potential recruits and their influencers concerning enlistment into the Army.

Researchers from RAND Arroyo Center developed a model to help the Army analyze the cost of different overarching recruiting strategies, resource mixes, and enlistment eligibility policies in a range of recruiting environments. The model and results are described in

---

[2]   All expenditure and cost figures are expressed in real (inflation-adjusted) 2012 dollars. To adjust for inflation, we use the consumer price index for all urban consumers (the CPI-U).

detail in the next chapters. Chapter Two describes our national-level model to predict Army enlisted accessions. In Chapter Three, we use the model to assess costs related to meeting the accession requirement, comparing four recruiting resource and enlistment eligibility mixes using the Army's major recruiting policy options. We estimate the costs of a strategy that optimizes the mix of resources, the preferred strategy, but also examine the costs of an incentive-centric strategy, which could be required to deal with unanticipated changes, such as in the size of the EDEP, unemployment rate, or accession requirement. Chapter Four reviews our key results and discusses additional considerations in meeting the Army's future recruiting needs.

Model for Assessing the Feasibility and Costs of Meeting Accession Requirements

We developed a national-level model to predict Army enlisted accessions. Our model predicts contracts and accessions for all months. This allows us to model the timing of flows of enlistees into and out of the Delayed Entry Program (DEP),[1] which differ depending on the type of enlistee and the prevailing recruiting conditions.[2] A key component of the model is prediction of monthly high-quality,[3] non-prior service (NPS) enlistment contracts.[4] The equation we use to predict the number of such contracts highlights four of their key determinants:

- number of on-production recruiters
- expenditures on television advertising

---

[1] Also known as the *Future Soldier Training Program*.

[2] The equations that govern DEP dynamics in the prediction model are developed using Army data for fiscal years (FYs) 2006–2012; see the discussion later in this report.

[3] Using standard terminology, *high-quality* enlistees are those who have earned regular high-school diplomas and whose performance on the Armed Forces Qualification Test placed them in any of the categories I to IIIA, i.e., the upper half of the national aptitude distribution. Other recruits are all those not classified as high quality.

[4] We modeled the effects of resource levels on high-quality contracts in order to use estimates from the econometric literature on enlistment supply in which the dependent variable in a multiple-regression analysis is almost always a count of NPS high-quality contracts or, more often, some transformation of these counts, such as its natural logarithm. This is discussed in detail later in this report.

- enlistment incentives (or bonuses) for high-quality prospects[5]
- the national unemployment rate (ages 16 and older).

Specifically, we assume that the number of high-quality NPS contracts signed during a particular month is determined as the sum of five terms:

(1) $H = f_R(R) + f_A(A) + H_B(b, e) + f_U(U) + K$

where

- H = the total number of high-quality contracts signed during a particular month
- R = the number of on-production, Regular Army (OPRA) "foxhole" recruiters during that month[6]
- $f_R(R)$ = a function that maps the number of recruiters during a month into increments of H in that month, other things being equal
- A = television advertising spending during that month
- $f_A(A)$ = a function that maps television advertising expenditures during a month into increments of H in that month, other things being equal
- b = the size of the incentive (enlistment bonus) paid to all *incentive-eligible* high-quality enlistees

---

[5] Enlistment incentives include Military Occupational Specialty (MOS) and seasonal ("quick-ship") bonuses and the actuarial value of future educational benefits.

[6] Our production functions are based on existing data and research, which have logically used the number of on-production, Regular Army (OPRA) foxhole recruiters, i.e., the number of Regular Army recruiters directly involved in the enlistment of youth into the Regular Army. Since the advent of *Small Unit Recruiting*, which assigns recruiting missions at the station level versus the recruiter level, the Army refers to the number of on-production available recruiters in the Required Recruiting Force. OPRA foxhole recruiters represent about 92 percent of that number, based on information from U.S. Army Recruiting Command (USAREC). Because the relationship between the number of recruiters and production in the research literature has been based on OPRA foxhole recruiters, we report and cost that figure.

- e = the proportion of high-quality enlistees who are eligible for (i.e., receive) an enlistment incentive (of size b)
- $H_B(b, e)$ = a function that maps incentive size and eligibility pairs during a month into increments of H in that month, other things being equal
- U = the unemployment rate during that month
- $f_U(U)$ = a function that maps the unemployment rate during a month into increments of H in that month, other things being equal
- K = a constant to be calibrated.

The recruiting resource factors we consider explicitly are R (recruiters), A (television advertising), and *(b,e)* (bonus value and eligibility rate).

We refer to the functions linking resource levels to high-quality contracts—specifically, $f_R(R)$, $f_A(A)$, and $H_B(b, e)$—as *resource-productivity functions*. These functions specify in quantitative terms how the Army's *opportunities* to generate high-quality enlistments change when the Army adjusts each policy lever. These three resource-productivity functions are constructed—i.e., functional forms (or shapes) are chosen based on conceptual considerations and parameters of the functions are calibrated—using estimates from previous econometric studies of Army enlistment supply. The function that maps unemployment rates into changes in H—namely, $f_U(U)$—is also constructed using estimates from the enlistment supply literature.

To assess the total cost of the accession requirement, we also must predict monthly contracts and accessions for *Other* (i.e., not high-quality) enlistees. The enlistment supply literature, however, is largely silent on the issue of how enlistments of Others are determined. Therefore, we predict numbers of enlistments of Others using our predicted levels of high-quality enlistments (or accessions) and assumptions about the quality mix of enlistees (i.e., the proportion that is high quality). For example, if the proportion of total contracts (accessions) that are high quality is 0.55, then we assume that 0.8182 Other contracts (accessions) are generated for each high-quality contract.

We consider three categories of recruiting conditions: *bad*, *average,* and *good*. Bad recruiting conditions, such as those during fiscal years (FYs) 2006–2008, are characterized by relatively low unemployment rates and fewer average months in the DEP (because the Army needs to ship enlistees relatively quickly to fill training seats and meet the annual accession requirement). Average recruiting conditions are characterized by unemployment rates between those for bad and good conditions. Good conditions occur when serving in the Army is a more appealing option for prospects, such as when unemployment rates are higher—e.g., as they were during FYs 2010–2012. When recruiting conditions are more favorable, average time in the DEP tends to be higher because there is less pressure to accelerate accessions. Specifically, we assume unemployment rates of 5.0, 6.5, and 8.0 percent under bad, average, and good conditions, respectively.

Accounting for External Factors That Affect Recruiting Opportunities

In addition to the values of the recruiting resources and enlistment-eligibility policies the Army controls, we assessed the effects of external factors not controlled by the Army. They include the unemployment rate—the role of which is explicit in equation *(1)*—and many others represented by the constant K in that equation. The external determinants subsumed by K include such factors as the number of qualified military available youth, macroeconomic conditions affecting military prospects' nonmilitary alternatives that are not well captured by measured unemployment rates, and recruiting policies of other military services, including their levels of recruiting resources and enlistment-eligibility policies. While the focus of this report is on the assessment of alternative recruiting resource and enlistment-eligibility policies under alternative recruiting conditions and strategies, the model has additional capability to assess the impact of assumptions concerning significant changes in propensity to join the Army driven by external factors, such as combat casualties or the overall image of the military.

Enlistment Supply Studies

It is crucial that our resource-productivity functions represent how the marginal effectiveness of a particular resource depends on how much of that resource is used. In the enlistment-supply literature, analysts commonly assume that the functional form linking high-quality contracts to the level of a recruiting resource is *log-linear*—i.e., both the number of high-quality contracts and the level of the resource are measured in logarithms. Thus, analysts typically estimate elasticities of contracts with respect to levels of recruiting resources (other things being equal). Unfortunately, such constant elasticities imply patterns that are implausible (see Dertouzos and Garber, 2003, pp. 32–33). We use more appropriate functional forms to develop our resource-productivity functions.

Resource Productivity Functions for Recruiters

Foxhole recruiters are recruiters who are assigned to recruiting stations and whose primary duties are to recruit youth into the Army, in contrast to recruiter supervisors or other managers or aides. We developed a function that predicts how many additional high-quality contracts would be produced—other things being equal—for increasingly large numbers of recruiters.

Overview of Approach

The recruiter-productivity function was developed in two steps. First, we chose a quadratic *functional form* to allow for the likelihood that recruiter productivity is subject to diminishing returns, which means that, as the number of recruiters is increased while other determinants of enlistments are held constant, the number of additional high-quality contracts produced by successively adding another recruiter will be smaller and smaller.

Second, we chose a particular quadratic function to use—by choosing the coefficients of R and R^2 to calibrate the function. We

chose these coefficients using previous estimates from econometric enlistment supply studies.

The method we used does not *force* the recruiter-productivity function to exhibit diminishing returns. Nor does it force adding an additional recruiter to predict more enlistments. In fact, the function we specify *does* exhibit the properties that we expected based on theoretical considerations; namely, more recruiters produce more high-quality contracts (up to some number of recruiters), other things being equal, and the marginal effectiveness of R declines as R increases (diminishing returns to adding recruiters). This function exhibits positive marginal effectiveness of recruiters for all values of R up to $R = 9{,}664$, which is considerably higher than recent historical values.

Resource Productivity Function for Television Advertising

Overview of Approach

We developed the television advertising productivity function (i.e., $f_A(A)$ in equation *(1)*) in two steps. The first step was choosing a functional form, and the second was choosing the parameters of the function. Below, we consider these steps in turn.

Shape of the Advertising Productivity Function

First, we chose an S-shaped functional form for the relationship predicting how monthly high-quality contracts would increase, other things being equal, as the Army spends more on television advertising each month. The conceptual underpinnings of this functional form are as follows.

It is widely believed that, for an advertising message to affect behavior, a recruiting target must be exposed to the message with sufficient frequency and that, after a target has been exposed with sufficient frequency, additional exposures will not further affect behavior (Dertouzos and Garber, 2003). This suggests two patterns that are incorporated in our television advertising productivity function (i.e., $f_A(A)$ in equation *(1)*). First, for low values of expenditures, the marginal return to increasing spending is fairly low. This is because low

levels of advertising expenditure do not allow ads to be seen enough times by many people in the target audience of 18–24-year-olds and those who influence them. This phenomenon underlies the concept of a *threshold level* of advertising, up to which advertising expenditures have essentially no effect on enlistments. Second, for very large levels of expenditures, the marginal return to increasing spending is also fairly low. This is because most members of the target audience already have been reached with sufficient frequency to affect their behavior, if it can be influenced. This phenomenon underlies the concept of a *saturation level* of advertising, above which advertising expenditures have essentially no effect on enlistments.[7] Between the threshold and saturation levels, the marginal effectiveness of additional television advertising is relatively high. These patterns imply that the television advertising productivity function should be S-shaped.[8]

Calibrating the Advertising Productivity Function

Dertouzos and Garber (2003) used S-shaped functional forms to estimate effects on high-quality contracts of advertising in four traditional media, namely, television, radio, magazines, and newspapers. We constructed the S-curve used in the prediction model for this study by updating estimates for television advertising of Dertouzos and Garber (2003), who used Army data from the early 1980s. These data are by far the most detailed Army advertising data ever assembled.[9]

---

[7]   For ease of exposition, the descriptions in the text suggest a specific level of advertising expenditure is associated with a threshold and another specific (higher) expenditure level is associated with saturation. The existence of such spending levels would require discontinuities in the television advertising productivity function; this function is continuous, however. In practice there are no particular threshold or saturation values of television advertising spending. It seems most helpful to choose or define threshold and saturation spending levels, however, so that the marginal cost of additional contracts using television advertising are so high that the Army would never choose advertising spending levels below (above) the threshold (saturation) level defined this way.

[8]   More specifically, the function has a sigmoid shape similar to the shape of a cumulative distribution for a normally distributed random variable.

[9]   These data were also used in Polich, Dertouzos, and Press (1986) and Dertouzos (1989). The updating accounted for changes from the early 1980s to 2012 in nominal (then-year) prices of buying television advertising time and the size of the young male population.

Dertouzos and Garber also explained that enlistment effects of advertising messages transmitted during a given month are likely to be spread out over that month and several subsequent months; that is, much advertising is likely to involve "lagged" effects. We incorporated five months of lagged effects as estimated by Dertouzos and Garber.

Resource-Productivity Function for Incentives

Our high-quality incentive function—i.e., $H_B(b,e)$ in equation *(1)*—expresses numbers of high-quality contracts as an increasing, linear function of the product of b and e, which we refer to as *incentive generosity*.[10] The function $H_B(b,e)$ implies steadily increasing incremental costs of high-quality contracts as incentive generosity—i.e., b, e, or both—increases.

We first considered what information we could extract from Army enlistment-supply studies employing observational data and concluded that estimates from that literature provide an inadequate basis for developing the incentive-productivity functions because of the endogeneity problem.[11] Therefore, instead, we calibrated our bonus function using results from the national Enlistment Bonus Experiment (EBE) conducted by RAND (Polich, Dertouzos, and Press, 1986) and recent data on average incentive sizes for high-quality prospects and proportions of high-quality enlistees who receive an incentive. In the EBE, different bonus sizes (b) were assigned to different geographic areas

---

To adjust for changes in real (inflation-adjusted) prices from the early 1980s to 2012, we developed three price indexes for buying advertising time on network television using data on nominal CPMs (cost per thousand impressions) from TVB (www.tvb.org/trends). These CPM data—which we first adjusted for inflation using the consumer price index for all urban consumers—pertain to three time-of-day intervals. To construct a single index, we averaged the three indexes.

[10] Since b is the size of the bonus and e is the probability that a randomly selected high-quality enlistee will receive it, the product of b and e is the mathematical expectation of the bonus dollars received by a randomly selected high-quality enlistee.

[11] The endogeneity problem arises because incentives are typically increased when production is lower than desired and decreased when it improves. This creates a spurious negative association between bonus expenditures and concurrent enlistments.

(*test cells*) that had been carefully balanced on a range of factors related to enlistment production, but the breadth of eligibility (*e*) was constant across the country. Thus, the results of the EBE are informative about the effects of varying *b* (the incentive) holding *e* (high-quality enlistees who get a bonus) constant.

We used data from FYs 2006–2008 and FYs 2010–2012, which were characterized by bad and good recruiting conditions, respectively. During FYs 2006–2008 the average incentive offer for high-quality enlistments was about $19,700 (a value of *b* under bad conditions) and just about 90 percent of high-quality enlistees received incentives (a value of *e* under bad conditions). The corresponding figures for FYs 2010–2012 (during which recruiting conditions were good) were about $5,100 and 52 percent of high-quality enlistees.

In our policy simulations, when we increase *b*, we also increase *e* using a linear equation developed using data for FYs 2006–2008 and FYs 2010–2012, as reported in Table 2.1. We also develop analogous values and an analogous equation for Other contracts. We adapt and use estimates from Polich, Dertouzos, and Press (1986) to calibrate our high-quality bonus productivity function.

Table 2.1
Data Used to Specify How Breadth of Eligibility (e) Varies with Incentive Size (b)

Recruiting Conditions	Enlistee Type	Proportion Eligible (e)	Average Incentive (b) (2012 $s in 1,000s)
Bad[a]	High quality	0.899	19.70
	Other	0.534	15.43
Average[b]	High quality	0.673	12.44
	Other	0.341	8.81
Good[c]	High quality	0.448	5.19
	Other	0.149	2.19

NOTE: [a] Based on data for FYs 2006–2008.
[b] Simple averages of the corresponding values for bad and good conditions.
[c] Based on data for FYs 2010–2012.

Marginal Costs of High-Quality Contracts

Many enlistment-supply studies estimate the Army's marginal costs of high-quality contracts using particular recruiting resources, other things being equal. Such marginal costs are the costs to the Army of producing one additional high-quality contract by increasing the level of use of a particular recruiting resource. Two of our three resources—namely, television advertising and incentives—are, in fact, measured in dollar terms. To assign costs to recruiters, we assumed that each recruiter requires an annual expenditure of $118,000.[12]

Because the marginal effectiveness and cost of a recruiting resource depend on the level from which its use is increased, whereas the literature typically reports a single estimated value of the marginal cost, the reported estimates are best interpreted as pertaining to the average levels of the resource used to estimate marginal effectiveness. Conventional wisdom based on such estimates is that the recruiting resource with the highest marginal cost is military compensation, primarily because it cannot be targeted to subgroups of desired enlistees. Among the three recruiting resources included in our model, enlistment incentives are generally thought to have the highest marginal cost, followed by television advertising and recruiters.[13]

In our model, however, the marginal effectiveness of a recruiting resource differs substantially when different levels of use are assumed. As a result, for some plausible pairs of values of two different resources, which of them is more cost-effective can change. For example, the marginal effectiveness of television advertising is very low—and thus, the marginal cost is very high—for both low, below-threshold and high, above-saturation levels of television advertising expenditures. Moreover, the marginal effectiveness of foxhole recruiters would be very low for sufficiently large numbers of recruiters (because of diminishing returns). As a result, incentives could be more cost-

---

[12] This in an Army figure obtained from Headquarters, Department of the Army, Office of the Deputy Chief of Staff for Personnel (HQDA, G-1) and includes recruiter compensation and costs of recruiter operational support.

[13] See, for example, Asch, Heaton et al. (2010, pp. 28–33), Bicksler and Nolan (2009, pp. 17–34), and Congress of the United States (2006, pp. 15–18).

effective than television advertising or recruiters for levels of use of the three resources, although, as noted, that would not generally be true. The resource-productivity functions we use to assess recruiting resource requirements conform to conventional wisdom about relative marginal costs over broad ranges of the levels of use of recruiters, television advertising, and incentives for high-quality prospects.

Enlistment Effects of the Unemployment Rate

As seen in equation *(1)*, we include a term (i.e., $f_u(U)$) that represents the effects of changes in unemployment rates (U). We assume that $f_u(U)$ is a linear function of U, which we measure in percentage points. We calibrate the slope of this function by choosing a value for the elasticity of H with respect to U (denoted by η_{HU}) and choosing an unemployment rate for which this elasticity is assumed to hold.

Most enlistment-supply studies include an independent variable constructed using the unemployment rate in the geographic area corresponding to the unit of observation in the data used to estimate enlistments. Both the dependent variable and the independent variable are normally measured in logarithms. Thus, the estimated regression coefficient is an estimate of η_{HU}.[14]

Calibrating the Constant (*K*)

To predict numbers of contracts and accessions, we need to calibrate K, the constant in equation *(1)*. We did this by solving equation *(1)* for K:

$$(1') \ K = H - f_R(R) - f_A(A) - H_B(b, e) - f_U(U).$$

---

[14] Asch, Hosek, and Warner (2007) report several estimates of the elasticity of high-quality contracts with respect to the unemployment rate estimated using Army data since the post–Cold War drawdown. We used the midpoint of the estimates reported to calibrate the slope of $f_u(U)$.

The value of K depends, then, on the value of H, assumed number of recruiters, baseline value of monthly advertising spending, baseline values of high-quality incentives (b, e), and assumed unemployment rate.

Converting Contracts to Accessions

The numbers and timing of enlisted force accessions needed (rather than contracts) mean that we must take into account DEP loss rates and distributions of scheduled months from enlistment to accession.

We used historical data on DEP loss rates and time (numbers of months) in the DEP for these purposes.[15] To be faithful to historical patterns, we allowed distributions of the numbers of months in the DEP and DEP loss rates to differ, depending on the type of recruit and the recruiting conditions.

To model DEP dynamics, we begin by considering three recruit types, namely *high-quality seniors* (SAs or senior alphas), *high-quality graduates* (GAs or grad alphas), and all *Others*. We assume that the DEP dynamics for GAs and Others are the same, based on their similarity during FYs 2006–2012, and we combine these groups when mapping contracts into accessions and their timing. We allowed for different DEP dynamics for years with good, average, and bad recruiting conditions, because time in the DEP is considerably lower for GAs and Others when recruiting conditions are bad than when conditions are good. DEP time for SAs, however, shows little variation across recruiting conditions, and we modeled it accordingly. This is due to the fact that seniors must wait to graduate before they can access, resulting in considerably longer average months in the DEP.

Table 2.2 quantifies the patterns just described. We again used data from FYs 2006–2008 and FYs 2010–2012, respectively, to represent bad and good recruiting conditions. To represent an average year, we averaged the values across good and bad conditions. Three

---

[15] In constructing these distributions, consistent with our DEP data we allowed for 0 months (i.e., ship during the same month as signing) to 14 months in the DEP.

Table 2.2
Average Months in DEP and DEP Loss Rates for Two Groups of Enlistees

Recruiting Conditions	Senior Alphas		Grad Alphas and Others	
	Bad	Good	Bad	Good
Average months in DEP	7.03	7.14	1.56	4.31
DEP loss rate	0.17	0.16	0.06	0.11

patterns in the table warrant comment. First, DEP loss rates for SAs are higher than those for other enlistees. This is because for enlistees of all types, the probability of becoming a DEP loss increases with the scheduled number of months in the DEP (and seniors have more scheduled months in the DEP). Second, as noted, DEP loss rates for SAs are essentially the same under bad and good recruiting conditions. Third, DEP loss rates for GAs and Others are almost twice as high if recruiting conditions are good rather than bad. This is due to the fact that, when recruiting conditions are good, the DEP length is longer.

The different distributions of months in DEP and DEP loss rates are applied to our predicted numbers of contracts by type and month to generate predicted numbers of total accessions per month by enlistee type. Of course, in addition to the number of contracts signed during a given FY, accession flows during that year will depend on the size of the EDEP for the year. The EDEP contains enlistees who are in the DEP during the prior year but do not ship (access) by the end of that year. As discussed in the next section, in our analyses we assume alternatively that the EDEP contains 25 percent or 45 percent of the accession requirement.

Adjusting DEP Dynamics When Incentives Change

As described above, when the Army is not confident of making its accession requirement, enlistment incentives are typically made more generous to avoid failure. Some of the increase in incentive sizes reflects larger quick-ship bonuses. Thus, we should expect that, when b and e are increased, the distribution of months in the DEP will change

so that the average number of months in the DEP will decrease. To represent in our prediction model how the average number of months in the DEP changes when incentive size changes, we developed two equations—one that applies under bad recruiting conditions and another that applies under good conditions—that we use to adjust DEP lengths when incentive sizes are changed.

Cost Minimization

In our analyses, we predict the Army's choices of television advertising and incentives to minimize the associated expenditures.[16] More specifically, expenditures on television advertising and enlistment incentives for both high-quality and Other enlistees are minimized assuming various combinations of fixed values for the number of recruiters, the unemployment rate, the size of the EDEP, and enlistment eligibility (percentage of high-quality recruits, recruits with enlistment waivers, and prior service [PS] recruits).[17]

---

[16] The effects of varying the number of recruiters on resource requirements are estimated in separate model runs that optimize television advertising and incentive levels given the specified number of recruiters. As discussed later, ongoing work will allow simultaneous optimization of television advertising, incentives, and number of recruiters.

[17] To keep the exposition from getting cluttered, in this section we ignore the fact that in our policy simulations we also condition on the Army's enlisted accession requirement. The total annual expenditures (TE) to be minimized can be written as:

(4) $TE = \$118,000R + TV\$ + beH + b^L e^L L,$

where, for that FY

R = the number of recruiters

$TV\$$ = the chosen expenditure on television advertising

b = the average size of the enlistment incentive for high-quality enlistees under the assumed recruiting conditions

e = the proportion of high-quality enlistees receiving enlistment incentives under the assumed recruiting conditions

H = the number of high-quality enlistees

b^L = the average size of the enlistment incentive for Other enlistees under the assumed recruiting conditions

e^L = the proportion of Other enlistees receiving enlistment incentives under the assumed recruiting conditions

L = the number of Other enlistees.

We note that, in the analyses discussed in the next section that allow PS accessions, we use separate values for their incentives. They are based on the values used by the Army during FYs 2006–2012 in bad, average, or good recruiting conditions, and are calculated using an analogous procedure to that discussed earlier for non-prior service recruits. For PS recruits, we use overall values and do not distinguish H versus L contracts.

The cost minimization is subject to several kinds of constraints. First, we constrain the relative sizes of bonuses for high-quality compared with Other NPS enlistees to equal specific ratios, which differ over recruiting conditions, based on recent history. Second, we constrain the Army's choices of television advertising and incentive spending to avoid resource-level choices that are implausible in light of recent history and their marginal costs. Regarding television spending, we assume that, in the future, the Army will choose not to spend less than $36 million per year or more than $192 million per year because the marginal cost of high-quality contracts is excessive outside of this range.[18] Regarding incentives, we assume maximum and minimum values for b and e based on Army incentive data for FYs 2006–2012. These values vary for H versus L recruits. They also vary for lower-accession requirements based on applying our production function to the lower level. For the purpose of assessing lower requirements, we assume that the reduction in the number of accessions required will result equally from reduced levels of incentives, advertising, recruiters, and other resources (represented in the constant K).

Other Policy Changes: Waivers, Quality Marks, and Prior Service Accessions

Other policy changes are available to the Army to help it meet the accession requirement and avoid unacceptably expensive recruiting resource levels. These include three enlistment-eligibility policies: allowing more NPS enlistment waivers, reallocating recruiter time to

---

[18] During FYs 2010–2012, expenditures averaged less than this amount.

increase efforts to enlist more prospects not classified as high quality, and increasing the number of enlistments among individuals who have previously served in the Army—i.e., PS accessions.

Increasing NPS Enlistment Waivers

Analysis of waivers data for FYs 2006–2008 indicates that about 20 percent of the accessions involved waivers in bad recruiting conditions. The corresponding figure for good conditions, during FYs 2010–2012, was about 10 percent. In the analyses discussed shortly, we use a baseline level for enlistment waivers of 10 percent, allowing it to increase to 20 percent to help meet accession needs and reduce recruiting resource needs.

Lowering Quality Marks

Later in this report, we consider the production and cost effects of reallocations of recruiter time and effort from a requirement of 55 percent high-quality accessions to 45 percent. These values are consistent with those observed during FYs 2006–2012. Some empirical results from various analyses by Dertouzos and subject-matter expert input suggests that, on average, it takes two to three times as much recruiter time to enlist high-quality prospects as to enlist Others. In our model, we thus assume that the Army could increase Other enlistments by two and a half recruits for each decrease of one high-quality enlistment. In principle, incentive costs could increase or decrease when the quality mix is adjusted this way and at this relative rate. This is because accessions increase—which tends to increase costs—but lower-quality mix decreases costs for a given number of accessions because incentives for Others are less generous than those for high-quality enlistees.

Allowing More Prior-Service Accessions

The Army could also increase accessions by enlisting additional men and women who previously served in the Army. Army data for FYs 2006–2008 suggest the Army could be comfortable with 10,000 or more PS accessions per year. In contrast, recent data show almost no PS accessions. Consequently, in analyzing the potential for PS recruits to

help meet accession needs and lower costs, we vary the eligible number from 0 to 10,000.

Assessment of Resource Needs Under Alternative Economic Conditions Considering Recruiting Resource and Enlistment Eligibility Policy Trade-Offs

In this chapter, we use the models described earlier to assess the costs related to meeting a Regular Army accession requirement of 63,000.[1] In the first case, we estimate the costs of a strategy that optimizes the mix of television advertising and enlistment incentive resources, the preferred strategy given sufficient stability in the accession requirement and recruiting conditions to allow proactive planning. We also examine the greater costs of an incentive-centric strategy, which could be required to deal with unanticipated changes, such as in the size of the EDEP, unemployment rate, or accession requirement.

We compare four recruiting resource and enlistment eligibility mixes using the Army's major recruiting policy options, as shown in Table 3.1. We begin with a baseline option, reflecting recent levels of recruiters and enlistment eligibility. Option 2 increases the number of recruiters while holding the baseline levels of enlistment-eligibility policies and the EDEP constant. In Option 3, enlistment eligibility is increased, while holding the number of recruiters and EDEP level at their baseline levels. Option 4 uses the baseline levels of recruiters and enlistment-eligibility policies, but a larger EDEP. The greater enlistment-

---

[1] A requirement of 62,972 accessions is assessed based on earlier Army estimates of the requirement in FY 2018 absent a need to regenerate Brigade Combat Teams. The level is consistent with near-term plans.

Table 3.1
Recruiting Resource and Enlistment Eligibility Options Assessed

Recruiting Policy	Baseline Option	Option 2	Option 3	Option 4
Number of OPRA foxhole recruiters	5,821	6,500	5,821	5,821
Eligibility policy	55% high quality, 10% waivers, 0 PS	55% high quality, 10% waivers, 0 PS	45% high quality, 20% waivers, 10,000 PS	55% high quality, 10% waivers, 0 PS
EDEP	25%	25%	25%	45%

eligibility policies in Option 3 resemble those seen during the difficult recruiting period in FYs 2006–2008. The EDEP level of 25 percent is intermediate between that seen in difficult recruiting periods and the Army's traditional target of 35 percent. The 45-percent level resembles that seen only in very good recruiting periods. The policies assessed in Options 3 and 4 above can reduce costs substantially in the year of execution, but incur higher costs in other time periods. In Option 3, the costs are shifted to later years, when the additional losses associated with lower-quality recruits result in a greater recruiting requirement to preserve end strength as well as for increased compensation costs for PS recruits over the first term. In Option 4, some of the costs in the year of execution are shifted to the DEP buildup in the preceding year.

Results When Using Optimal Levels of Recruiting Resources

Table 3.2 presents our cost estimates for good recruiting conditions for the four different mixes of recruiting resources, eligibility policies, and EDEP levels described above. As can be seen from Table 3.2, if recruiting conditions are good and the EDEP is 25 percent, given the assumptions listed at the bottom of the table, our model estimates that the accession requirement could be achieved for $961 million. If the number of recruiters were increased to 6,500 OPRA foxhole recruiters to lower the cost of other resources, our model estimates that overall

Table 3.2
Estimated Resource Needs for Meeting Accession Requirements Under Good Recruiting Conditions for Alternative Resource and EDEP Levels and Eligibility Policies

Resource	Baseline ($ M)	Increased Recruiters ($ M)	Increased Eligibility ($ M)	EDEP of 45 Percent ($ M)
Television ad spending	$159	$126	$36	$46
Incentives	$115	$114	$103	$89
Recruiters	$687	$767	$687	$687
Additional costs	—	—	$312	$127
Total cost	$961	$1,007	$1,138	$948

ASSUMPTIONS: EDEP = 25 percent, unless stated as 45 percent; OPRA foxhole recruiters = 5,821, unless alternate case of 6,500; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0, unless eligibility increased to high-quality accessions = 48.28 percent, waivers = 17.24 percent, PS = 7,645; U = 8 percent.

costs would increase by $46 million. In contrast, if eligibility were increased instead of the number of recruiters being increased (to high-quality accessions = 48.28 percent, waivers = 17.24 percent, PS recruits= 7,645),[2] our model estimates that *year-of-execution recruiting resource costs for television advertising and incentives* would fall by $135 million. This approach necessitates increased accessions over time to replace losses, however, because of the higher attrition rate of lower-quality recruits and some waiver categories.[3] In addition, compensation costs would increase because of the greater regular military compensation (RMC) for PS recruits.[4] We estimate the overall additional cost to be

---

[2] Under good recruiting conditions, the full increase in eligibility levels is not needed to reach the floor levels for television advertising and incentive resource levels.

[3] Based on historical data from the Total Army Personnel Data Base, we estimate this difference at about 15 percentage points over the first term, and we estimate the average cost of recruiting and training a replacement to be about $65,000 according to information provided by USAREC based on an assessment of FY 2014 costs by HQDA, G-1.

[4] Based on current data, we estimate the difference in RMC to be about $9,000 annually over the first term, which we set at an average length of four years. This is calculated using a pay grade of E3, one year of service, and single marital status for the first two years and pay

$312 million, with nearly 90 percent attributable to increased (RMC) for PS recruits over the first term. This implies that the savings in the year of execution would be offset, with an overall increase in total cost of $177 million instead. The cost of the eligibility changes could be lowered by using attrition screeners such, as the Tier Two Attrition Screen (TTAS) or its successors (here, by about $20 million), as well as by trading off a lower high-quality percentage and higher waiver percentage in lieu of PS accessions. Last, if the number of recruiters and eligibility were held constant but the EDEP were increased to 45 percent, our model estimates that *year-of-execution costs* would decrease by $139 million. Additional resources would be required in the preceding year to build the EDEP. The magnitude and distribution of such costs across recruiting resources would depend on a number of factors, such as the timing of the EDEP buildup and the recruiting conditions, resourcing policies, and enlistment-eligibility policies in effect during that period. For the recruiting conditions, resourcing policies, and enlistment-eligibility policies represented in the first column of Table 3.2, we estimate the cost of the EDEP buildup at $127 million. If so, it essentially would offset the savings in resources in the year of execution, reducing total cost by about $13 million.

Table 3.3 presents our analogous model estimates for average recruiting conditions. Given the assumptions at the bottom of Table 3.3, the accession requirement could be achieved for $1,159 million. If the number of recruiters were increased to 6,500, overall costs would decrease by $61 million. In contrast, if eligibility were increased instead (as noted in Table 3.3), overall costs in the year of execution would fall by $291 million. However, costs associated with the increased accessions needed to replace the greater losses and greater compensation for PS recruits are estimated at $412 million. Thus, total cost would increase by $122 million. Attrition screeners, such as TTAS, could help to lower costs (here, by about $25–30 million), as would trading off a lower high-quality percentage

---

grade E4, three years of service, and married for the last two years for NPS recruits. For PS recruits, we use E4, five years of service, and married for the first two years, and E5, seven years of service, and married with one child for the last two years.

Table 3.3
Estimated Resource Needs for Meeting Accession Requirements
Under Average Recruiting Conditions for Alternative Resource
and EDEP Levels and Eligibility Policies

Resource	Baseline ($ M)	Increased Recruiters ($ M)	Increased Eligibility ($ M)	EDEP of 45 Percent ($ M)
Television ad spending	$178	$173	$69	$105
Incentives	$295	$157	$113	$100
Recruiters	$687	$767	$687	$687
Additional costs	—	—	$412	$296
Total cost	$1,159	$1,098	$1,281	$1,188

ASSUMPTIONS: EDEP = 25 percent, unless stated as 45 percent; OPRA foxhole recruiters = 5,821, unless alternate case of 6,500; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0, unless eligibility increased to high-quality accessions = 45 percent, waivers = 20 percent, PS = 10,000; U = 6.5 percent.

and higher waiver percentage in lieu of PS accessions. Lastly, if recruiters and eligibility were held constant, but the EDEP were increased to 45 percent, overall costs would decrease by $268 million in the year of execution. We estimate the cost of the EDEP buildup at $296 million, which would offset the savings realized in the year of execution.

Table 3.4 presents our analogous estimates for bad recruiting conditions. Given the assumptions listed at the bottom of Table 3.4, the accession requirement could be achieved for $1,403 million. If recruiters were increased to 6,500, total cost is estimated to decrease by $83 million. If eligibility were increased instead, year-of-execution costs would fall by about $488 million. However, the cost of the increased accessions needed and greater RMC for PS recruits is estimated at $412 million, which implies a net savings of about $75 million in total cost. Attrition screeners could lower costs (by about $25–30 million), as would lowering the high-quality percentage and increasing waivers in lieu of PS accessions. Lastly, if recruiters and eligibility were held constant but the EDEP were increased to 45 percent, year-of-execution costs would decrease by $475 million. We estimate the cost of the

Table 3.4
Estimated Resource Needs for Meeting Accession Requirements Under Bad Recruiting Conditions for Alternative Resource and EDEP Levels and Eligibility Policies

Resource	Baseline ($ M)	Increased Recruiters ($ M)	Increased Eligibility ($ M)	EDEP of 45 Percent ($ M)
Television ad spending	$182	$181	$111	$139
Incentives	$535	$372	$118	$103
Recruiters	$687	$767	$687	$687
Additional costs	—	—	$412	$564
Total cost	$1,403	$1,320	$1,328	$1,493

ASSUMPTIONS: EDEP = 25 percent, unless stated as 45 percent; OPRA foxhole recruiters = 5,821, unless alternate case of 6,500; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0, unless eligibility increased to high-quality accessions = 45 percent, waivers = 20 percent, PS = 10,000; U = 5 percent.

EDEP buildup at $564 million, offsetting the year-of-execution savings and increasing total cost by $90 million.

Results When Using Incentive-Centric Strategies

As above, in the next three tables we use the model described earlier to assess the costs related to meeting the Army's accession requirement under alternative recruiting resource strategies and eligibility policies, considering the recruiting conditions assumed to prevail. Distinct from the analytical results presented in Tables 3.2–3.4, the results in Tables 3.5–3.7 are based on an incentive-centric strategy in which the use of enlistment bonuses is prioritized over the use of advertising resources and increasing the number of recruiters. An incentive-centric approach might be preferred when unanticipated increased production and faster shipping times are needed (such as when recruiting conditions unexpectedly worsen), the EDEP is smaller than expected, or when the accession mission increases from a lower level. This preference is due to the fact that both advertising and recruiter increases take longer to

put into place and the return on that investment takes longer to realize. In other respects, the assumptions and cases examined below parallel those in Tables 3.2–3.4.

Table 3.5 presents our model estimates for an incentive-centric strategy under good recruiting conditions for the four different mixes of recruiting resources, eligibility policies, and EDEP levels described above. If recruiting conditions are good, given the assumptions at the bottom of the table, our model estimates that the accession requirement could be achieved for $1,302 million. This is nearly $350 million more than the cost of the baseline approach for the optimal advertising-incentive mix results for good recruiting conditions shown in Table 3.2, due to the greater cost of incentives. However, for the incentive-centric strategy, the alternative resource mix and enlistment-eligibility policy approaches provide greater and considerable utility in lowering total cost. Given an increase to 6,500 OPRA foxhole recruiters, overall costs would decrease by $69 million. We note that the larger number of recruiters would need to be in place beforehand and effectively producing enlistment contracts for this savings to be realized during the year of execution. If eligibility were increased instead (to the

Table 3.5
Estimated Resource Needs to Meet Accession Requirements for Incentive-Centric Strategy Under Good Recruiting Conditions for Alternative Resource and EDEP Levels and Eligibility Policies

Resource	Baseline ($ M)	Increased Recruiters ($ M)	Increased Eligibility ($ M)	EDEP of 45 Percent ($ M)
Television ad spending	$36	$36	$36	$36
Incentives	$579	$430	$103	$93
Recruiters	$687	$76	$687	$687
Additional costs	—	—	$312	$282
Total cost	$1,302	$1,233	$1,138	$1,098

ASSUMPTIONS: EDEP = 25 percent, unless stated as 45 percent; OPRA foxhole recruiters = 5,821, unless alternate case of 6,500; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0, unless eligibility increased to high-quality accessions = 48.28 percent, waivers = 17.24 percent, PS = 7,645; U = 8 percent.

levels noted at the bottom of Table 3.5), we estimate that year-of-execution costs would fall by $476 million. The associated cost of the increased accessions needed over time and greater RMC for PS recruits is estimated at $312 million, partially offsetting the savings realized in the year of execution and resulting in an overall decrease in total cost of $164 million. These savings could be increased through using attrition screeners (here, by about $20 million) or a lower high-quality percentage and/or higher waiver percentage instead of PS accessions. Lastly, if recruiters and eligibility were held constant, but the EDEP were increased to 45 percent, year-of-execution costs would decrease by about $485 million. However, the cost of the EDEP buildup is estimated at just over $280 million. If so, it would partially offset the savings realized in the year of execution, but still result in substantial estimated savings in total cost of about $200 million.

Table 3.6 presents our analogous estimates for average recruiting conditions. Given the assumptions at the bottom of the table, the accession requirement could be achieved for $1,661 million. This is about $500 million more than the analogous total cost for the optimal recruiting resource mix strategy. If recruiters were increased to 6,500,

Table 3.6
Estimated Resource Needs to Meet Accession Requirements for Incentive-Centric Strategy Under Average Recruiting Conditions for Alternative Resource and EDEP Levels and Eligibility Policies

Resource	Baseline ($ M)	Increased Recruiters ($ M)	Increased Eligibility ($ M)	EDEP of 45 Percent ($ M)
Television ad spending	$56	$36	$36	$36
Incentives	$918	$759	$150	$273
Recruiters	$687	$767	$687	$687
Additional costs	—	—	$412	$497
Total cost	$1,661	$1,562	$1,285	$1,493

ASSUMPTIONS: EDEP = 25 percent, unless stated as 45 percent; OPRA foxhole recruiters = 5,821, unless alternate case of 6,500; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0, unless eligibility increased to high-quality accessions = 45 percent, waivers = 20 percent, PS = 10,000; U = 6.5.

total cost would decrease by $99 million. If eligibility were increased instead (to high-quality accessions = 45 percent, waivers = 20 percent, PS recruits = 10,000), overall cost would fall by $788 million in the year of execution. However, we estimate an increased cost of $412 million to replace greater losses and for the greater RMC of PS recruits. Thus, the decrease in total cost would be lower, at $376 million. Using attrition screeners could further reduce total cost (here, by about $25–30 million), as could trading off a lower high-quality percentage and higher waiver percentage in lieu of PS accessions. Lastly, if recruiters and eligibility were held constant but instead the EDEP were increased to 45 percent, overall costs would decrease by $665 million in the year of execution. For the recruiting conditions, resourcing policies, and enlistment-eligibility policies represented in the first column of Table 3.6, we estimate the cost of the EDEP buildup at $497 million. If so, it would significantly offset the $665 million in savings in resources in the year of execution, but still result in substantial estimated savings of $168 million in total cost.

Table 3.7 presents our analogous estimates for bad recruiting conditions. Given the assumptions listed at the bottom of the table,

Table 3.7
Estimated Resource Needs to Meet Accession Requirements for Incentive-Centric Strategy Under Bad Recruiting Conditions for Alternative Resource and EDEP Levels and Eligibility Policies

Resource	Baseline ($ M)	Increased Recruiters ($ M)	Increased Eligibility ($ M)	EDEP of 45 Percent ($ M)
Television ad spending	$106	$79	$36	$36
Incentives	$958	$958	$367	$492
Recruiters	$687	$767	$687	$687
Additional costs	—	—	$412	$653
Total cost	$1,751	$1,805	$1,502	$1,868

ASSUMPTIONS: EDEP = 25 percent, unless stated as 45 percent; OPRA foxhole recruiters = 5,821, unless alternate case of 6,500; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0, unless eligibility increased to high-quality accessions = 45 percent, waivers = 20 percent, PS = 10,000; U = 5 percent.

the accession requirement could be achieved for $1,751 million. This is about $350 million more than the analogous total cost for the optimal recruiting resource mix strategy. If recruiters were increased to 6,500, total cost would increase by $54 million. If eligibility were increased instead, overall costs would fall by $661 million in the year of execution. We estimate the increased cost of accessions to replace greater losses and the greater RMC for PS recruits to be $412 million. This implies a net savings in total cost of $249 million. Using attrition screeners could increase savings (by about $25–30 million), as could using a lower high-quality percentage or higher waiver percentage in lieu of PS accessions. Lastly, if recruiters and eligibility were held constant but instead the EDEP were increased to 45 percent, overall costs would decrease by $536 million in the year of execution. We estimate the cost of the EDEP buildup at $653 million for bad recruiting conditions and the resourcing and enlistment-eligibility policies represented in the first column of Table 3.7. If so, it would more than offset the savings in resources in the year of execution, resulting in a net increase in total cost of $117 million.

Results for Lower-Accession Requirement

For comparison with the foregoing results, in the next three tables, we use the model described earlier to assess the costs related to meeting a smaller accession requirement under a lower end strength for the base case (represented in the leftmost column of Tables 3.2–3.4) for both the optimal and incentive-centric strategies, considering good (Table 3.8), average (Table 3.9), and bad (Table 3.10) recruiting conditions.

Table 3.8 compares our estimates for the two accession requirements under good recruiting conditions. Given the assumptions listed at the bottom of the table, the 63,000 accession requirement could be achieved for $961 million. For the smaller accession requirement of just under 58,000,[5] total cost would fall to $877 million. About two-thirds

---

[5] A requirement of 57,831 accessions is assessed based on earlier Army estimates of the requirement in FY 2018, absent a need to regenerate Brigade Combat Teams scaled down for

Table 3.8
Estimated Resource Needs for Optimal and Incentive-Centric Strategies Under Good Recruiting Conditions for Alternative Accession Requirements

Resource	63,000 Baseline ($ M)	63,000 Incentive-Centric ($ M)	57,800 Baseline ($ M)	57,800 Incentive-Centric ($ M)
Television ad spending	$159	$36	$148	$36
Incentives	$115	$579	$61	$434
Recruiters	$687	$687	$669	$669
Total cost	$961	$1,302	$877	$1,138

ASSUMPTIONS: EDEP = 25 percent; OPRA foxhole recruiters = 5,666; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0; U = 8 percent.

of this reduction is attributable to the fact that the smaller accession requirement facilitates more efficient use of resources, in which the use of incentives decreases relative to the use of television advertising. For similar reasons, an analogous result is seen for the incentive-centric strategy, where some 80–85 percent of the reduction in total cost is attributable to the reduction in incentives.

Table 3.9 compares our estimates for the two accession requirements under average recruiting conditions. Given the assumptions at the bottom of the table, the 63,000 accession requirement could be achieved for $1,159 million. For the smaller accession requirement, total cost would fall to $1,021 million. About 85 percent of this reduction is attributable to the reduced use of incentives. An analogous result is seen for the incentive-centric strategy, for similar reasons.

Table 3.10 compares our estimates for the two accession requirements under bad recruiting conditions. Given the assumptions at the bottom of the table, the 63,000 accession requirement could be achieved for $1,403 million. Total cost would fall to $1,233 million for the smaller accession requirement. Again, about 85 percent of this reduction is attributable to reduced use of incentives. Analogous results are seen for the incentive-centric strategy.

---

a reduction in end strength from 490,000 to 450,000.

Table 3.9
Estimated Resource Needs for Optimal and Incentive-Centric Strategies Under Average Recruiting Conditions for Alternative Accession Requirements

Resource	63,000 Baseline ($ M)	63,000 Incentive-Centric ($ M)	57,800 Baseline ($ M)	57,800 Incentive-Centric ($ M)
Television ad spending	$178	$56	$176	$36
Incentives	$295	$918	$176	$742
Recruiters	$687	$687	$669	$669
Total cost	$1,159	$1,661	$1,021	$1,447

ASSUMPTIONS: EDEP = 25 percent; OPRA foxhole recruiters = 5,666; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0; U = 6.5 percent.

Table 3.10
Estimated Resource Needs for Optimal and Incentive-Centric Strategies Under Bad Recruiting Conditions for Alternative Accession Requirements

Resource	63,000 Baseline ($ M)	63,000 Incentive-Centric ($ M)	57,800 Baseline ($ M)	57,800 Incentive-Centric ($ M)
Television ad spending	$182	$106	$175	$99
Incentives	$535	$958	$389	$821
Recruiters	$687	$687	$669	$669
Total cost	$1,403	$1,751	$1,233	$1,588

ASSUMPTIONS: EDEP = 25 percent; OPRA foxhole recruiters = 5,666; high-quality accessions = 55 percent, waivers = 10 percent, PS = 0; U = 5 percent.

Summary of Results and Their Implications

The research described in this report was conducted to improve the Army's ability to use recruiting resources and policies effectively to meet accession requirements under varying recruiting conditions. It assesses potential effects of alternative recruiting resource and enlistment eligibility policies on recruit production and costs. We consider the cost of meeting enlisted force accession requirements when an optimal mix of television advertising and incentives is feasible or, alternatively, when an incentive-centric strategy is required.

Summary of Primary Results

The results in Table 3.2 show that, under good recruiting conditions and with sufficient time to use a strategy of optimizing the mix of television advertising and incentives for meeting an accession requirement of 63,000, it was not advantageous from a total cost perspective to increase recruiters, enlistment eligibility, or the EDEP from the baseline levels assessed in our analyses (which were based on marginal cost estimates and recent Army recruiting practices and experiences). As recruiting conditions become average, the results in Table 3.3 indicate that increasing the number of recruiters became advantageous in reducing total costs. As recruiting conditions further worsen to become bad, the results in Table 3.4 indicate that increasing the number of recruiters or enlistment eligibility each lowered costs, here by at least $75 million relative to the baseline approach.

When there is not sufficient time to use a strategy of optimizing the mix of television advertising and incentives for meeting an accession requirement of 63,000, total cost increases substantially, by some $350–500 million in the cases modeled. The results in Table 3.5 indicate that, under good recruiting conditions and an incentive-centric strategy, using additional recruiters reduced total cost, here by $69 million. Increasing enlistment eligibility or the EDEP from the baseline levels we assessed were even more effective in lowering total cost. The savings in this example are estimated to be $164 million for increased eligibility and $204 million for the increased EDEP approach. The results in Table 3.6 indicate that, under average recruiting conditions, increasing recruiters reduced total cost, here by $99 million. Increasing enlistment eligibility was most effective in increasing savings; here, the estimated reduction in total cost was $376 million. Increasing the EDEP from the baseline levels assessed in our analyses would also be effective in lowering total cost, more so than increasing recruiters but considerably less so than by increasing eligibility. The savings here were estimated to be $168 million. As recruiting conditions become bad, the results in Table 3.7 indicate that, under an incentive-centric strategy, the one preferable alternative to the baseline resource, eligibility, and EDEP levels was to increase enlistment eligibility, which was estimated to reduce total cost by $249 million.

What are the implications of the analyses under reduced accession requirements? Although it is beyond the scope of this report to present the full set of comparisons for each of the resourcing and policy alternatives assessed for 63,000 for reduced accession requirements, some general observations can be made based on the results shown in Tables 3.8–3.10 and from earlier work we carried out examining recruiting resource requirements for end strengths of 450,000 and 420,000, given sufficient time to use a strategy of optimizing the mix of television advertising and incentives for meeting the accession requirement. First, as discussed earlier, a smaller accession requirement facilitates more efficient use of recruiting resources, in which the use of incentives decreases relative to the use of television advertising. Second, the results for increasing the number of recruiters, enlistment eligibility,

and increasing the EDEP size relative to the baseline case across good, average, and bad recruiting conditions resemble those shown earlier in this report. This is because the reduced accession requirement lowers the costs of these alternatives just as it does for the baseline approach, and for analogous reasons.

Limitations of the Current Recruiting Resource and Enlistment Eligibility Model

It is worth noting that there is some imprecision inherent in the specific cost estimates discussed in this report for the recruiting resources and changes in enlistment-eligibility policies examined, as is true for all estimates, and that they are likely to change in the future because of such factors as inflation and the cost of achieving a given number of impressions from advertising. Additionally, possible interactions in the effectiveness of recruiting resources and eligibility policies were partially but not completely considered. For example, bonus amounts needed to meet requirements varied as the mix of recruit quality or NPS versus PS recruits changed, and adding recruiters produced more enlistments when the quality mix was lower. At the same time, although enlistments increased as advertising or incentives were increased, the effect of adding recruiters did not covary with these increases, other things being equal. Also, as noted, the effect of adding recruiters was based on a number of estimates made over different periods of time. It did not account specifically for possible effects on recruiter productivity of the use of station-level missioning instead of individual missioning or for any notable changes in responsibility for recruiting reservists among recruiters focused on enlistments into the Regular Army. It is unlikely that these considerations affect the utility of the model in assessing the overall pattern of results and their implications in a significant way. That is because the underlying production functions use established functional forms, are based on detailed data collected under controlled conditions, or over a series of studies and years, and because their results have been calibrated using recent Army resourcing and eligibility practices, which we apply in our analyses.

Finally, it is worth noting that, in FYs 2013–2014, the Army greatly reduced enlistment incentive eligibility. Although this reduced costs in the year of execution, it resulted in a reduction in enlistment contracts, significantly shorter DEP lengths between contracting and shipping in order to fill training seats, and notable reductions in the EDEP for the following year. The results discussed earlier in this report are, instead, based on maintaining a healthy end-of-year DEP size that facilitates meeting the next year's accession requirement. Nonetheless, our ongoing modeling work will carry out several refinements to the foundational work underlying the results discussed in this report, in part to enhance the model's ability to deal with such policy changes when they are under consideration. We will allow bonus values to be independent of the percentage of recruits eligible to receive them. Currently, based on past Army practice, they covary in amount and direction. Bonuses also will be divided into MOS and quick-ship bonuses. While it is reasonable to assume some covariation in effects on the number of enlistments and timing of the related accessions, the effects of each type (and mix of both) on enlistments and DEP length will be modeled.

We also will seek to develop a separate production function for lower-quality recruits (Others). As discussed, because prior recruiting research has focused on high-quality recruits, our current model estimates Other production based on high-quality production.

Lastly, number of recruiters will be added as a policy variable that can be included in the optimization set, eliminating the need to assess the effects and costs of the other resources for varying levels of recruiters. In addition, DEP length and end-of-year DEP size will be added as policy variables that can be included as inputs to the optimization.

Additional Incentives and Eligibility Policies to Increase Enlistments

The analyses in this report indicate how changing various recruiting resource and eligibility policy levels can affect recruiting success. In this section, we briefly consider examples of possible additional

approaches to increasing enlisted supply—one involving incentives and the other involving eligibility to enlist (see Loughran and Orvis, 2011). Such approaches merit consideration not only because they can potentially help to lower costs, but also because less than half of youth qualify to serve in the Army, and the number of eligible youth is declining.[1] Therefore, to help ensure future recruiting success and to do so at minimal cost, it is important to assess additional ways to increase young people's interest in serving in the Army and their eligibility to do so.

Compared with the period in which the All-Volunteer Force began, most American youth now attend college. The National Center for Education Statistics' data for 2012 indicate that 80 percent of youth graduate from high school; the Bureau of Labor Statistics' data for the same year further indicate that two-thirds of them enroll in college by fall of their graduation year. Given these data, the Army needs reasonable penetration of the college-bound youth market. At the same time, results from the spring 2014 Joint Advertising Market Research and Studies youth survey reveal that one-fourth of the respondents considered "possibility of interference with college education" as a main reason for not joining the military (U.S. Department of Defense, 2014). Although the Post–9-11 GI Bill provides substantial benefits for education after service, a program to increase the supply of high-quality recruits by attracting youth unwilling to defer college attendance could potentially benefit both young people and Army recruiting. On the enlisted side, such a program would be aimed primarily at the junior college market.

Obesity continues to be a significant health issue in the United States and in enlistment eligibility. The Assessment of Recruit Motivation and Strength (ARMS), discussed in detail in Loughran and Orvis (2011), provides an example of possible changes to eligibility

---

[1] This percentage has been found consistently over the past decade in both USAREC and RAND Arroyo Center analyses of Army enlistment and youth population data from the Census, Current Population Survey, National Longitudinal Survey of Youth, and Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System. It considers educational, aptitude, medical, moral, legal, and number of dependent restrictions on enlistment.

requirements to achieve enlisted market expansion. When the Army implemented ARMS at six study sites in 2005, and then at all Military Entrance Processing Stations in 2006, the hope was that it would increase accessions among ARMS-qualified overweight and over–body fat applicants without adversely affecting attrition. The evidence suggests that ARMS did that. We estimate that ARMS increased male accessions by 13 percent and female accessions by 20 percent at the study sites, while having no effect on attrition rates through 18 months of service. Moreover, ARMS was inexpensive to implement, comparing very favorably to the estimated per-accession cost of other Army recruiting resources that might have needed to be expanded or increased in value to produce the same increase in enlisted supply.

Several caveats are appropriate. First, we do not know whether the broader implementation of ARMS was as successful as that at the study sites. Second, it is not clear whether ARMS accessions are as productive as within-standard accessions in the longer run. More recent, longer-term analysis by the office of the Deputy Chief of Staff for Personnel, Headquarters Department of the Army suggests that many ARMS recruits had later difficulty in meeting Army Physical Fitness Test and weight-based reenlistment standards. Lastly, ARMS appeared to increase the number of overweight but within body-fat accessions, who would not necessarily be screened by the ARMS test. Such accessions had elevated rates of fitness and medical reasons among separations. If the ARMS program is reinstated, attention will need to be paid to promoting fitness and weight standard compliance for recruits over the longer term.

Selected Bibliography

Angrist, Joshua D., and Jörn-Steffen Pischke, *Mostly Harmless Econometrics—An Empiricist's Guide*, Princeton, N.J.: Princeton University Press, 2009.

"Army 2020, Investment and Regeneration (I&R)," briefing slides from a teleconference on January 29, 2013.

Asch, Beth J., Paul Heaton, James Hosek, Paco Martorell, Curtis Simon, and John T. Warner, *Cash Incentives and Military Enlistment, Attrition, and Reenlistment*, Santa Monica, Calif.: RAND Corporation, MG-950-OSD, 2010. As of October 27, 2015:
http://www.rand.org/pubs/monographs/MG950.html

Asch, Beth J., James R. Hosek, and John T. Warner, "New Economics of Manpower in the Post-Cold War Era," in Todd Sandler and Keith Hartley, eds., *Handbook of Defense Economics*, Volume 2: Defense in a Globalized World, Amsterdam: Elsevier, 2007, pp. 1075–1138.

Bicksler, Barbara A., and Lisa G. Nolan, *Recruiting an All-Volunteer Force: The Need for Sustained Investment in Recruiting Resources—An Update*, Arlington, Va.: Strategic Analysis, Inc., December 2009.

Congress of the United States, *Recruiting, Retention, and Future Levels of Military Personnel*, Washington, D.C.: Congressional Budget Office, October, 2006.

Dertouzos, James N., *The Effects of Military Advertising: Evidence from the Advertising Mix Test*, Santa Monica, Calif.: RAND Corporation, N-2907-FMP, 1989. As of October 27, 2015:
http://www.rand.org/pubs/notes/N2907.html

———, *The Cost-Effectiveness of Military Advertising: Evidence from 2002–2004*, Santa Monica, Calif.: RAND Corporation, DB-565-OSD, 2009. As of October 27, 2015:
http://www.rand.org/pubs/documented_briefings/DB565.html

Dertouzos, James N., and Steven Garber, *Is Military Advertising Effective? An Estimation Methodology and Applications to Recruiting in the 1980s and 90s*, Santa Monica, Calif.: RAND Corporation, MR-1591-OSD, 2003. As of October 27, 2015:
http://www.rand.org/pubs/monograph_reports/MR1591.html

———, *Human Resource Management and Army Recruiting: Analysis of Policy Options*, Santa Monica, Calif.: RAND Corporation, MG-433-A, 2006. As of October 27, 2015:
http://www.rand.org/pubs/monographs/MG433.html

———, *Performance Evaluation and Army Recruiting*, Santa Monica, Calif.: RAND Corporation, MG-562-A, 2008. As of October 27, 2015:
http://www.rand.org/pubs/monographs/MG562.html

Layton, Lyndsey, "National High School Graduation Rates at Historic High, but Disparities Still Exist," *Washington Post*, April 28, 2014. As of October 27, 2015:
https://www.washingtonpost.com/local/education/high-school-graduation-rates-at-historic-high/2014/04/28/84eb0122-cee0-11e3-937f-d3026234b51c_story.html

Loughran, David S., and Bruce R. Orvis, *The Effect of the Assessment of Recruit Motivation and Strength (ARMS) Program on Army Accessions and Attrition*, Santa Monica, Calif.: RAND Corporation, TR-975-A, 2011. As of October 27, 2015:
http://www.rand.org/pubs/technical_reports/TR975.html

Murray, Michael, and Laurie L. McDonald, *Recent Recruiting Trends and Their Implications for Models of Enlistment Supply*, Santa Monica, Calif.: RAND Corporation, MR-847-OSD/A, 1999. As of October 27, 2015:
http://www.rand.org/pubs/monograph_reports/MR847.html

Polich, J. Michael, James N. Dertouzos, and S. James Press, *The Enlistment Bonus Experiment*, Santa Monica, Calif.: RAND Corporation, R-3353-FMP, 1986. As of October 27, 2015:
http://www.rand.org/pubs/reports/R3353.html

U.S. Department of Defense, "Joint Advertising Market Research and Studies Youth Poll," Spring 2014.

U.S. Department of Labor, Bureau of Labor Statistics, "College Enrollment and Work Activity of 2013 High School Graduates News Release," April 22, 2014. As of October 27, 2015:
http://www.bls.gov/news.release/archives/hsgec_04222014.htm

Warner, John T., "Military Recruiting Programs During the 1980s: Their Success and Policy Issues," *Contemporary Economic Policy*, Vol. 8, No. 4, October 1990, pp. 47–67.

Warner, John T., and Beth J. Asch, "The Economics of Military Manpower," in Todd Sandler and Keith Hartley, eds., *Handbook of Defense Economics, Volume 1*, Amsterdam: Elsevier, 1995, pp. 347–398.

Warner, John T., and Curtis J. Simon, "Estimates of Army Enlistment Supply 1988–2005." briefing presented to the military recruiting summit, Clemson University, S.C., and Arlington, Va., November 2, 2005.

Warner, John T., Curtis J. Simon, and Deborah M. Payne, *Enlistment Supply in the 1990s: A Study of Navy College Fund and Other Enlistment Incentive Programs*, Arlington, Va.: Defense Manpower Data Center, DMDC Report No. 2000-015, April 2001.

———, "The Military Recruiting Productivity Slowdown: The Roles of Resources, Opportunity Cost and the Tastes of Youth," *Defence and Peace Economics,* Vol. 14, No. 5, October 2003, pp. 329–342.

This report describes research conducted to improve the Army's ability to use recruiting resources and enlistment eligibility policies effectively to meet enlisted accession requirements under good, average, and bad recruiting conditions. We consider the cost of meeting accession requirements when an optimal mix of television advertising and enlistment incentives is feasible (the baseline strategy) or when an incentive-centric strategy—which favors incentives over other resources due to the faster rate of increasing recruits through incentives—is required.

The results for the alternative scenarios assessed—which increase the number of recruiters, enlistment eligibility, or Entry Delayed Entry Program (EDEP) level from their levels in our baseline strategy—indicate that, under good recruiting conditions, optimizing the mix of television advertising and enlistment bonuses minimized total cost, whereas increasing the number of recruiters, enlistment eligibility, or youth recruited during the preceding year (larger EDEP) from their baseline levels raised cost. For average recruiting conditions, increasing recruiters reduced total cost. Under bad recruiting conditions, increasing recruiters or enlistment eligibility each lowered total cost by similar amounts.

An incentive-centric strategy raises total cost relative to optimizing the mix of advertising and bonuses. Given an incentive-centric strategy, under good recruiting conditions, a higher number of recruiters, increased enlistment eligibility, or a larger EDEP each reduced total cost and did so by increasing amounts, respectively. Under average conditions, more recruiters, a larger EDEP, or greater enlistment eligibility each reduced total cost, by increasing amounts, respectively. Under bad conditions, only increasing enlistment eligibility was preferable to the incentive-centric baseline strategy.

RAND | ARROYO CENTER

www.rand.org

$12.50

9 780833 092236